

The BAI-PC as a Screen for Anxiety, Depression, and PTSD in Primary Care

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Despite the prevalence of psychiatric disorders in medical settings, mental health problems often go undetected and patients do not receive appropriate treatment. The main goal of this study is to provide additional information about the Beck Anxiety Inventory – Primary Care (BAI-PC), a brief instrument that screens for patients with anxiety. This study provides information on the performance of the BAI-PC as a screening instrument for depression and PTSD in addition to its original purpose as a screening instrument for anxiety. This efficient tool can identify patients who can benefit from effective psychological treatments and facilitate referrals to psychologists working in medical settings.

KEY WORDS: primary care; screening; anxiety; depression; PTSD.

Psychologists are often called upon to assess and treat mental health issues that arise in medical settings. Several studies have demonstrated that there are high rates of psychiatric disorders among primary care patients (Barrett, Barrett, Oxman, & Gerber, 1988; Coyne, Fechner-Bates, & Schwenk, 1994; Roy-Byrne & Katon, 2000; Stein, McQuaid, Pedrelli, Lenox, & McCahill, 2000). One barrier to addressing mental health problems is that physicians and psychologists in medical settings often have limited time with each patient; they cannot comprehensively assess the mental health needs of all the patients in the clinic. In recognition of this difficulty, self-report screening instruments have been developed in an attempt to accurately and efficiently identify patients who could benefit from a more comprehensive psychological evaluation (Beck, Steer, Ball, Ciervo, & Kabat, 1997; Breslau, Peterson, Kessler, & Schultz,

1999; Prins, 1999; Spitzer et al., 1994). In order to be incorporated into a busy medical setting, a screening instrument must be easy to administer, provide practical information quickly, and identify commonly encountered psychological symptoms (e.g. symptoms of depression, anxiety, PTSD). Finally, the measure should have a demonstrated ability to accurately identify such symptoms in a variety of medical populations. Many screening instruments developed to date have not been widely adapted because they fail to meet these requirements.

Beck, Steer, et al. (1997) have shortened and adapted the widely-used Beck Anxiety Inventory (BAI; Beck, Steer, & Garbing, 1988) and Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and developed versions for use in primary care (i.e. BAI-PC and BDI-PC). These instruments have been shown to be methodologically sound, and have the added benefit of being very brief and are easy to use.

Since these measures were introduced, several additional studies have been conducted supporting the efficacy of the BDI-PC among a variety of populations (Beck, Guth, Steer, & Ball, 1997; Steer, Cavalieri, Leonard, & Beck, 1999; Winter, Steer, Jones-Hicks, & Beck, 1999). However, no additional published studies examining the BAI-PC were found

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using Medline and PsycLIT searches, suggesting the need for further investigation. Given this need, and the fact that the instrument is easily administered, we decided to examine the utility of this instrument in our clinic.

In order for a screening instrument to be useful, there should be evidence that it can effectively identify the population of interest. When evaluating screening tools for a particular disorder, high sensitivity, specificity, and clinical efficiency are desirable attributes. Sensitivity, the most important quality of a screening tool, represents the tool's ability to correctly identify or "screen in" individuals with the disorder. Specificity represents the tool's ability to correctly identify or "screen out" individuals without the disorder. Clinical efficiency refers to the proportion of individuals who are correctly identified by the tool.

Using the Anxiety and Mood Modules of the Primary Care Evaluation of Mental Disorders (PRIME-MD) (Spitzer et al., 1994) to assess patients for anxiety and mood disorders, Beck, Steer, et al. (1997) reported that the greatest clinical efficiency (82%) for the BAI-PC was produced using a cutoff score of 5 and higher. Using that cutoff, they reported an 85% sensitivity rate and an 81% specificity rate for detecting those who did or did not meet criteria for panic, generalized anxiety, or both. Additionally, Beck, Steer, et al. (1997) provided preliminary evidence that the BAI-PC also may be useful for detecting clinical depression in primary care patients. These authors found that patients diagnosed with mood disorders had BAI-PC scores that were 4.5 times higher than patients without mood disorders. This suggests that research examining the utility of the BAI-PC as a single screen for both anxiety and depression is warranted.

Although many studies have focused on depression and anxiety (i.e., panic and generalized anxiety disorders) in primary care (Barrett et al., 1988; Coyne et al., 1994; Roy-Byrne & Katon, 2000), posttraumatic stress disorder has more recently been recognized as being prevalent in medical settings (Samson, Bensen, Beck, Price, & Nimmer, 1999; Stein et al., 2000). For example, estimates range from 11.8% in the general population (Steer et al., 1999) to 20% among Veterans Administration (VA) ambulatory care patients (Hankin, Spiro, Miller, & Kazis, 1999). It also has been demonstrated that patients with PTSD use more healthcare resources than patients without PTSD (Marshall, Jorm, Grayson, & O'Toole, 2000; Steer et al., 1999). These findings underscore the need to screen for this disorder, especially in the VA.

Although PTSD screening measures have been developed (e.g. Breslau et al., 1999; Prins, 1999), it is unclear whether it is necessary to have a separate screening measure for this specific anxiety disorder. Although the BAI-PC was examined as a screen for panic and generalized anxiety disorders, Beck, Steer, et al. (1997) did not assess its utility as a screen for PTSD, suggesting the need for further investigation.

In sum, psychiatric disorders are prevalent among medical patients. Developing effective screening mechanisms for identification of patients with mental health problems is necessary in order for psychologists to provide effective treatments. Beck, Steer, et al. (1997) presented promising results for brief screening measures (the BDI-PC and the BAI-PC) to screen for anxiety and depression in primary care. Although the BDI-PC has been studied in additional populations, further research on the BAI-PC is lacking. The first goal of this study was to provide information on the clinical utility of the BAI-PC in another medical setting. In addition, this study investigated the performance of the BAI-PC as a screening instrument for depression and PTSD. This paper presents an instrument that can simplify the screening process by minimizing the number of measures administered, while maximizing the information that is available to the psychologist for clinical decision making.

THE EVALUATION OF THE BAI-PC

Participants

Participants were 313 outpatients from the VA Boston Healthcare System Primary Care Clinics (see Table I for demographics). They were predominantly male (98%), mostly Caucasian (77%), with a mean age of 64. Nearly half (47%) of the participants were married at the time of the interview, and 81% reported at least a high school education.

Procedure

Patients with primary care appointments between June 1998 and October 1998 were recruited either by phone contact or in-person on the day of their appointment. Recruitment initially involved obtaining lists of patients with primary care appointments for the upcoming month and calling each patient on the list to set up an appointment to

Table 1. Sample Characteristics

Variable	N	%	M	SD	Range
Gender	(313) ^a				
Male	306	97.8%			
Female	7	2.2%			
Age	(310)		63.6	13.2	28–94
Race	(311)				
White	239	76.8%			
Black	65	20.9%			
Hispanic	5	1.6%			
Asian	2	.6%			
Marital Status	(308)				
Married	146	47.4%			
Divorced/Separated	72	23.4%			
Widowed	29	9.4%			
Single, Never Married	61	9.4%			
Education (years)	(310)		12.8	2.6	3–23
Less than high school	60	19.3%			
High school or equivalent	120	38.7%			
Post-high school	130	42.0%			

^aNumbers in parentheses represent number of participants for whom data were available.

complete the survey on the same day as the primary care appointment. Despite this time-intensive effort, recruitment proceeded very slowly: only 18.2% (156/857) were successfully reached and completed the instruments. Many patients were unreachable by phone, or there were last minute primary care scheduling changes and cancellations that made them unable to participate. Thus, an alternate recruitment strategy was employed. The second method involved randomly approaching patients in the primary care waiting area. The second strategy was much more successful: 76.6% (157/205) of the individuals approached by research staff completed the instruments. A detailed comparison of the two recruitment strategies is available from the authors.

After signing the informed consent that was approved by the VA Boston Healthcare System Institutional Review Board, participants were asked to complete a number of self-report instruments. The BAI-PC was administered as part of a battery of questionnaires for a larger project that was designed to examine lifestyle and psychological problems among primary care patients in the VA Boston Healthcare System (LoCastro, Mori, Grace, & Costello, 1996; Mori, LoCastro, Grace, & Costello, 1997; Niles, Grace, Gibeau, & Kaloupek, 1997). Participants took approximately 40 min to complete the entire battery of questionnaires, and were reimbursed \$5 for their time. Completion of the BAI-PC took approximately 1 min.

Beck Anxiety Inventory for Primary Care (BAI-PC)

The Beck Anxiety Inventory for Primary Care is a 7-item self-report instrument that is a subset of items from the original 21-item Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988). Beck, Steer, et al. (1997) chose these items because they have repeatedly been shown to reflect a subjective dimension of self-reported anxiety. Each item is rated on a 4-point scale ranging from 0 to 3 and a total score is calculated by summing the ratings of the seven items.

Comparison Measures

The BAI-PC was examined in relation to the well-validated Beck Anxiety and Depression Inventories (i.e., BAI and BDI), and in relation to the previously validated PTSD Checklist.

Beck Depression Inventory (BDI)

The Beck Depression Inventory (Beck et al., 1961) is a 21-item self-report inventory designed to assess depressed mood and vegetative symptoms. Each item is rated on a 4-point scale ranging from 0 to 3 and a total score is calculated by summing the ratings of the 21 items. The BDI has been in use for more than 35 years and has become one of the most frequently used instruments for detecting depression in normal populations. This measure has shown correlations with clinician ratings of depression from .62 to .75 (Beck, Steer, et al., 1988). According to the BDI manual (Beck & Steer, 1987), scores 19 and greater represent moderate to extremely severe depression. Therefore, for the purposes of this study, a cutoff of 19 and above was selected as the criterion for clinical depression.

Beck Anxiety Inventory (BAI)

The Beck Anxiety Inventory (Beck, Epstein, et al., 1988) is a 21-item self-report questionnaire designed to assess the severity of anxiety symptoms. Each item is rated on a 4-point scale ranging from 0 to 3 and a total score is calculated by summing the ratings of the 21 items. Overall, the BAI is considered useful in discriminating anxious from nonanxious diagnostic groups and is significantly correlated with a number of other accepted measures of self-reported and

clinically-rated anxiety (Beck & Steer, 1990). According to the BAI manual (Beck & Steer, 1990), scores 19 and higher represent moderate to extremely severe anxiety. Therefore, for the purposes of this study, a cutoff of 19 and above was selected as the criterion for clinical anxiety.

PTSD Checklist (PCL)

The PCL (Weathers, Huska, & Keane, 1991) is a 17-item self-report questionnaire designed to assess current PTSD symptomatology corresponding to the 17 symptoms of PTSD delineated in DSM-IV. Each item is rated on a 5-point scale ranging from 1 to 5 and a total score is calculated by summing the ratings of the 17 items. This measure has demonstrated good sensitivity (.82) and specificity (.83) in a veteran population (Weathers, Litz, Herman, Huska, & Keane, 1993) and has been shown to be highly correlated (.93) with a structured diagnostic interview for PTSD in a population of motor vehicle and sexual assault victims (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). Weathers et al. (1993) recommend 50 and above as a cutoff score to represent current PTSD in a veteran population.

RESULTS

The BAI-PC items were factor-analyzed using Principal Components Factor Analysis. One factor emerged (Eigenvalue = 4.0, factor loadings ranged from .57 to .83), with good internal consistency ($\alpha = .90$). Item-total correlations ranged from .51 to .78. BAI-PC scores were then calculated by summing each of the scores on the 7 items to produce a total score for each individual (ranging from 0 to 21). The mean BAI-PC score was 4.27 ($SD = 4.70$) and the range was 0–21. The BAI-PC scores were highly correlated with the full BAI; $r(300) = .74, p < .001$. This high correlation was expected given that the BAI-PC is an abbreviated version of the original 21-item BAI. Thus, the seven items appeared to be measuring a single construct, presumably anxiety, with very good internal consistency.

Using the recommended cutoff score of 5 and above (Beck, Steer, et al., 1997), the BAI-PC demonstrated a sensitivity of 84.5% and specificity of 79.5% in identifying patients with and without clinical anxiety (see Table II). These rates are remarkably similar to those reported by Beck, Steer, et al.,

Table II. Sensitivity, Specificity, and Clinical Efficiency for the BAI-PC by Disorder

Mental Health Problem	Percent of sample (N)*		Sensitivity**	Clinical Efficiency
Anxiety (BAI \geq 19)	23.5% (72/307)	.85	.80	.81
PTSD (PCL \geq 50)	11.5% (48/309)	.97	.73	.75
Depression (BDI \geq 19)	15.5% (36/313)	.91	.75	.75
Anxiety, PTSD, or Depression	27.1% (83/306)	.82	.83	.83

*Varying Ns reflect missing data.

**Sensitivity = the proportion of true diagnoses correctly identified [true positives/(true positives + false negatives)]. Specificity = the proportion of true nondiagnoses correctly identified [true negatives/(true negatives + false positives)]. Clinical efficiency = the proportion of correctly screen-identified diagnoses within the total sample [(true positives + true negatives)/total sample size].

1997, and further support the utility of this measure for screening anxiety disorders in primary care settings.

As stated earlier, we also were interested in how well the BAI-PC performed as a screen for Depression and for PTSD in primary care. Using the same BAI-PC cutoff of 5 and above, this measure demonstrated a sensitivity of 91.1% and a specificity of 74.7% as a screen for depression (see Table II), and demonstrated a sensitivity of 97.2% and a specificity of 72.6% as a PTSD screen (see Table II).

Since the BAI-PC appeared to be a good screening measure for anxiety, PTSD, and depression when examined separately, we wanted to determine how well it performs when we consider these disorders in combination. Previous research has established that there is a high level of overlap among these disorders (e.g., Keane & Kaloupek, 1997; Lenze et al., 2000; Lydiard & Brawman-Mintzer, 1998; Stein et al., 2000). This study provides further evidence of high comorbidity in this primary care sample; our comparison measures indicated that 27.1% of the participants were positive for at least one disorder and among these, 57.3% met criteria for at least one additional disorder. Thus, the sensitivity and specificity were calculated to determine how well the BAI-PC simultaneously screens for any one or more of the three disorders discussed above (i.e., anxiety, PTSD, and depression). Using the same BAI-PC cutoff of 5, this measure demonstrated a sensitivity of 82.4% and a specificity of 82.7% (see Table II) with 35.6% (109/306) of the participants screening positive.

DISCUSSION

In this study, the BAI-PC exhibited high internal consistency and good construct validity, and demonstrated good sensitivity and specificity in differentiating among primary care patients with and without anxiety. Interestingly, sensitivity and specificity rates nearly identical to those reported in the Beck, Steer, et al., (1997) study were found (85% and 80%, respectively, for this study and 85% and 81% for the initial Beck study). These findings support the clinical utility of the BAI-PC in a veteran population, providing further evidence that this measure has the potential to be an effective screen for anxiety in a variety of patient populations.

As stated above, the BAI-PC was originally examined as a screen for panic and generalized anxiety disorders. This study suggests that the BAI-PC also may be an effective screen for a third anxiety disorder, PTSD. A cutoff of 5 and above on the BAI-PC afforded sensitivity and specificity rates of 92% and 72%, respectively. This high sensitivity rate suggests that the BAI-PC is an effective screening tool for PTSD in primary care.

Furthermore, the BAI-PC also showed promise as a screen for depression in the veteran population. Similar to the findings of Beck, Steer, et al. (1997), this study provided additional evidence that the BAI-PC may be useful for detecting clinical depression in primary care patients. A cutoff of 5 and above on the BAI-PC yielded sensitivity and specificity rates of 91% and 75%, respectively.

Screening measures with high sensitivity rates are desirable because it increases the likelihood that primary care patients suffering from the targeted disorders will obtain a positive screen. Although maximizing sensitivity does result in more false positives, it minimizes the likelihood of false negatives. The primary purpose of the screening measure is to alert the healthcare system to problems and to initiate the process of further assessment and treatment; false positives can be screened out. For this reason, the relatively lower specificity rates that were found using the BAI-PC to screen for PTSD and depression are acceptable, and similar to what has been found for other screening measures used in primary care (Mulrow, Williams, Gerety, Ramirez, Montiel, & Kerber, 1995).

The results of this study suggest that the BAI-PC can be used as an effective screening measure for anxiety, PTSD, and depression. Given the high rate

of comorbidity among these three disorders, it can be useful and more efficient to use an instrument that screens for all three at one time rather than using three separate instruments. However, it is important to acknowledge that the BAI-PC is meant to be used as a "red flag" and not as a diagnostic tool. It is a time saving measure that is intended to help primary care providers determine the need for further consultation. A positive screen on the BAI-PC indicates that a patient should be referred for a thorough assessment of symptoms of generalized anxiety, panic, PTSD, and depression. As with any other brief screen, a diagnosis and treatment plan can only be developed after a more thorough assessment is conducted.

One limit of this study was the use of the BAI, BDI, and PCL as "gold standards" for identifying patients with psychiatric disorders. Although these are well-validated and widely used instruments, it is necessary to replicate these findings using structured clinical interviews such as the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1995).

In sum, this study further demonstrates the clinical utility of the BAI-PC as a screening instrument for anxiety among primary care patients. In addition, this study provided promising preliminary results for using the BAI-PC as a screen for depression and PTSD. This measure has the advantages of being brief (takes approximately 1 min to complete the BAI-PC), and is easy to score. Future studies should replicate these findings with additional patient populations, using structured clinical interviews for making clinical diagnoses.

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